

REMARKS

Claim 1 has been amended to correct spelling as noted in the Office Action. Claims 1-18 and 28-34 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mo ('959) in view of Criton ('356), Rubin and Schechter.

Claims 1-18 and 28-34 recite a method of measuring ventricular dysynchrony of a heart. The Mo reference relates to the measurement of blood velocity within a blood vessel. There is no teaching or suggestion of the use of gated detection of heart wall motion, particularly along two distinct (septal and lateral) heart wall locations. Typically, tissue movement has a different frequency response than moving fluids due to the different densities of the two mediums and the different range of velocities. Prior art techniques for measuring linear fluid movement in a vessel are not readily adapted for measuring tissue movement, particularly the more complex motion of the heart wall. Consequently, one skilled in the art would not rely on the fluid measurement technique of Mo to solve this problem.

The Criton reference discloses a technique for edge detection of borders of the heart wall. However, there is no description or suggestion of a process using at least two distinct gated Doppler lines to measure heart wall dysynchrony, or to use such measurements in selecting lead delay settings for a pacemaker. Criton uses M-mode techniques supplemented by Doppler processing.

The present claims have been further amended to clarify that the claimed processes utilize a B-mode image to set a plurality of gates. Note specifically the location of cursor M in Fig. 2 of Criton indicating a direction of scan across the left ventricle. This is in contrast to claim 1, for example, which recites first and second spectral Doppler lines, which are used, for example, as shown in Fig. 12, 13A, and 13B to mark separate walls having movement that is out of phase. Criton does not teach or suggest how to use separate lines to measure separate wall locations to thereby measure dysynchrony. It is not apparent from Criton how to quantitatively and simultaneously measure two distinct regions of tissue.

Rubin discloses the use of a range gate in connection with a heart wall to assist with gated imaging. However, Fig. 5 of Rubin indicates that placement of the gate 226 can be made anywhere on the heart wall. Again, there is no suggestion that such gating be used to obtain diagnostically useful information from the heart wall motion itself.

Although Schechter describes heart wall dysynchrony, this reference provides no details regarding how ultrasound measurements of heart wall motion can be made as set forth in the pending claims.

One skilled in the art would not know how to practice the claimed invention based on the disparate methods employed by the different references.

New claims 45-46 have been added reciting further patentable aspects relative to the prior art. Reconsideration is respectfully requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

HE ET AL.

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By:\_\_\_\_/Thomas O. Hoover/\_\_\_\_  
Thomas O. Hoover  
Registration No. 32,470  
Attorney for Applicant(s)

WEINGARTEN, SCHURGIN,  
GAGNEBIN & LEOVICI LLP  
Ten Post Office Square  
Boston, MA 02109  
Telephone: (617) 542-2290  
Telecopier: (617) 451-0313

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